Quality-Adjusted Life Years (QALYs) of Tuberculosis Patients in the Intensive and Continuous Phase in a Private Hospital of Yogyakarta, Indonesia

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ABSTRACT

Context Tuberculosis is a disease with low quality of life (QoL) and quality-adjusted life years (QALYs) due to illness, impairment of health conditions and death. QALYs combine the QoL as well as quantity of life with value judgments utility of individuals or society.

Aims To compare the QoL and QALYs of tuberculosis patients between treatment on the intensive and the continuous phase.

Settings and Design This study used cohort design in a private hospital of Yogyakarta. Subjects were patients with newly diagnosed pulmonary tuberculosis and aged between 20 and 80 years.

Materials and Methods Data was collected using Indonesian version of St. George Respiratory questionnaire (SGRQ) and using the scenario time trade off method (TTO) at the end of 1st , 2nd , and , 3rd month treatment. The score obtained was used to measure patients' QoL and QALYs during the treatment phase.

Statistical Analysis To determine the differences of QoL and QALY in the intensive and continuous phase we used the paired samples t-test.

Results The average score of total QoL of tuberculosis patients using the SGRQ was 45.90% in intensive phase and 17.43% in the continuous phase ($p < 0.05$). While the average of QALYs values was 0.74 QALYs in intensive phase and 0.87 in the continuous phase ($p < 0.05$).

Conclusions Patients with pulmonary tuberculosis undergoing treatment with oral antituberculosis gain 0.74 QALY in the intensive phase and 0.87 QALY in continuous phase. Tuberculosis patients' QoL and QALY are better in the continuous phase than ones in the intensive phase.

KEYWORDS QALY, quality of life, tuberculosis, Indonesia

INTRODUCTION

Pulmonary tuberculosis (PTB) is an infectious disease which becomes a priority health issue in the developing country, including Indonesia. It is estimated that 95% of TB cases and 98% of TB deaths in the world occur in developing countries[1]. The estimation of TB incidence in Southeast Asia, is higher, reaching 182 cases per 100,000 populations and reaching 27 cases per 100,000 for the mortality rate in 2009[2].

The fact shows that TB remains a major public health problem in Indonesia, among others: Indonesia has the 5th highest number of TB patients in the world after India, China, South Africa and Nigeria. An estimated number of TB patients in Indonesia was around 5.8% of the total number of TB patients in the world[3].

According to Miller et al. (2009), in developed countries, TB is known as a disease with low lost QALY due to illness, deterioration of health conditions and death[4]. Several studies have shown that there is a deterioration of health conditions (chronic pulmonary symptoms) in the majority of patients who have undergone treatment for pulmonary tuberculosis (PTB)

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with oral anti-tuberculosis (OAT) drugs[5,6]. TB patients experienced the impaired of quality of life (QoL) in physical, psychological, social, role functioning and financial domains[7].

In Indonesia, QALYs has still not been considered yet as the outcome of chronic disease treatment. As a result, the burden of TB in individuals and the prevention value of TB to the community are underestimated. Therefore, it is necessary to estimate QALY lost PTB patients and the health loss that commonly occurs as a result of TB disease.

This study was conducted at the private hospital of Yogyakarta. To the best of our knowledge, study of QALYs in TB has not been done before in Indonesia. The objective of this study is to compare the QoL and QALYs of TB patients between treatment on the intensive and the continuous phase.

SUBJECTS AND METHODS

This study used cohort design with prospective data collection. Primary data was collected by observation and interviews of patients with PTB using Indonesian version of St. George Respiratory Questionnaire (SGRQ) and time trade-off (TTO) method approach. Subjects were all patients who met the inclusion criteria as newly diagnosed patients and age of >18 yo.

There are three domains in the measurement of QoL using the SGRQ; symptoms, activity and impact. While the QALY value was based on the acquisition of TTO as its valuating method. The range of values for a QALY value is 0 (death) to 1 (perfect health). Additionally, the characteristics data of patients were collected from a registry book TB-03, the patient's control card and the patient's medical record. This study has been approved by Ethical Committee of Faculty of Medicine, University of Muhammadiyah Yogyakarta, number 011/EP-FKIK-UMY/I/2015. All patients signed the consent form after informed about the study by the researcher.

TTO scenario is prepared and then it is given to the patients by asking patients to choose between alternatives way, as follows: (1) in a state of ill condition, with a long life expectancy for sure (t) and death or (2) being healthy by the time (x), where x is shorter than the time t. Time frame or the number of years in full health is indicated by the minimum of 0 to a maximum of 10 years. Patients can then choose how many years they think similar to 10 healthy years. Utility score for the state of health is then calculated by dividing x by t. Scores that will be obtained for each patient are between 0.0 (dead) to 1.0 (perfect health)[8].

The measurement of QoL and QALY is performed at the end of the 1st, 2nd and 3rd month of treatment with OAT. Data of intensive phase are an average of life quality and QALY in the 1st and 2nd month, while data of the 3rd month are the data of continuous phase.

Paired t-test was performed to determine whether there is any difference between the averages of QALYs on the intensive phase and the continuous phase.

RESULTS

The total of 30 patients with newly diagnosed of PTB and age of 20–80 years old were recruited in the period December 1, 2014 until February 28, 2015. Table 1 presents the characteristics' data of the patients.

Fig. 1 shows the scores of all domains of QoL during the intensive and continuous phase. In general, the patients' QoL are getting better with the decrease of the domains' scores. The worst scores of all domains are in the in first month of treatment.

The statistical test shows that there is a significant difference in the QoL in the intensive phase and the continuous phase, with an average QoL score in intensive phase was 45.90% and the continuous phase was 17.43% ($p < 0.05$).

Fig. 2 describes the average scores of QALYs in the first three months after given the treatment with OAT, where the higher score, shows the better quantity and QoL.

The statistical test showed that there were significant differences in the QALYs intensive phase (0.74 QALY) and the continuous phase (0.87) QALY ($p < 0.05$). This result means that each additional 1 year of life lived in conditions of perfect health is worth 0.74 QALY in the

Table 1 Patients' characteristics (n = 30).

Characteristics		Frequency	%
Sex	Male	20	66.7
	Female	10	33.3
Age	20–40	10	33.3
	41–60	12	40.0
	61–80	8	26.7
Last education	Elementary school	5	16.7
	Junior high school	3	10.0
	Senior high school	15	50.0
	Diploma	6	20.0
	Bachelor degree	1	3.3
Occupation	Farmer	6	20.0
	Student	4	13.3
	Entrepreneur	14	46.7
	Government	3	10.0
	Others	3	10.0

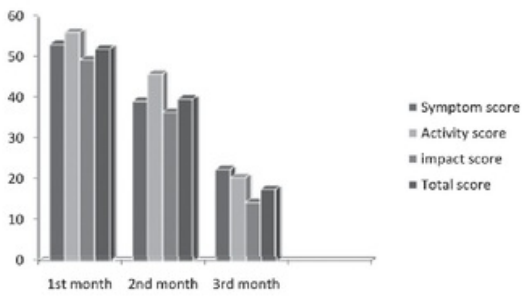

Fig. 1 The average score of quality of life.

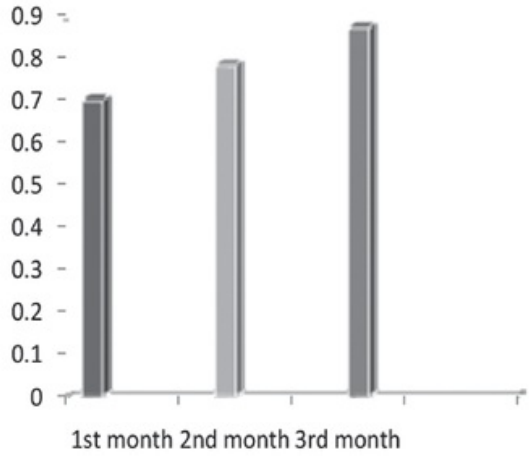

Fig. 2 The average score of QALY.

intensive phase and 0.87 QALY in the continuous phase. These results also explain that the QoL of TB patients were better in the continuous phase than in the intensive phase. The significance difference results of QALY value in the intensive phase and the continuous phase in this study, associated with an increase of the QoL of TB patients.

DISCUSSION

Our study presents that TB patients' QoL measured by SGRQ and TB patients' QALY measured by TTO are getting better in the continuous phase than in the intensive phase. In general, TB treatment using OAT may increase patients' QoL and QALYs value. The improvement of QoL is due to the effect of anti-tuberculosis therapy which includes each component of clinical symptoms, activities of life and social impact.

Most of TB patients in our study were male which is consistent with previous study in India. The study mentioned that the male has higher risk of TB infection and faster the transmission infection. The male subjects also had higher prevalence of positive smear than female[9]. Besides the patients' sex, other risk factors related to the TB were malnutrition, young age, alcohol, tobacco smoke, sosioeconomic and behavioural factors. In the developing countries, some risk factors may become the concern for the government, like socioeconomic and behavioural, air pollution and malnutrition which often correlated with children[10]. Most of the patients in our study are in the productive age, meaning that patients have risk for transmitting the disease to other person in their working environtment or may be some of them will experience productivity loss due to TB.

The lower QoL of TB patients are in the first two months of treatment with OAT or intensive phase when compared to the QoL in the third as the continuous phase. This is consistent with the findings of previous study which found that the improved QoL occurred at the end of the first month of therapy and at the end of the intensive phase of therapy[6]. The study of Othman et al. mentioned that patients with PTB have significantly poorer QoL than patients with extra-pulmonary TB (EPTB). The main difference was seen in the observation of the dimensions of symptoms during treatment in the intensive phase[5]. Other study in India, using other instruments in measuring the QoL, showed that the QoL of TB patients significantly improved under the TB treatment[7].

SGRQ has three domains which are symptoms, activity and impact. Symptoms and activity domains may be correlated with physical, psychological and role-functioning of patients. TB patients who experience more severe and longer duration of symptoms has lower score of physical domain in the previous study[11]. In Indonesia, there was a stigma about TB disease, which made TB patients should be isolated from the society. People in the environment of TB patients are easily being transmitted, thus most of TB patients in Indonesia tried to find the medical care not around the area of their house. This situation has significant impact to the social and psychological domains of the patients. Previous study also supported our findings that the stigma and severity of the disease may cause the lower score of social and psychological domains[6,12]. According to the treatment effectiveness, symptoms of TB will decrease significantly after the 2 months treatment, thus the three domains of SGRQ increase at the end of the intensive treatment. Our findings are in line with previous studies which showed the increase of physical and psychological domains' scores after the intensive phase[13]. Regarding the 6-month duration of TB treatment, other previous study found that the TB patients' QoL significantly improved in all domains[14].

The QALYs value shows that each additional 1 year of life lived in conditions of perfect health is worth 0.74 QALYs in the intensive phase and 0.87 QALY in the continuous phase. The significance difference results of QALY value in the intensive phase and the continuous phase in this study, associated with an increase of the QoL of TB. This result is consistent with studies by Miller et al. (2009) that people with TB culture confirmed (positive) recognised that the value of lifetime QALY is less than those who are not infected with TB. TB could result the QALYs lost is due to illness, impairment and mortality (impairment), and mortality (death). The majority of QALY lost because of TB due to deterioration of the health condition (impairment) after microbiologic cure[4].

The success of efforts to cure the patients from TB due to the treatment in intensive and continuous phase have significant impact to patients' QoL in symptom, activity and impact. TB treatment need 6 months duration minimally and patients may experience adverse drug effect which could influence the patients' adherence and QoL[15]. This result will be useful for the health policy maker, especially in supporting the health care system for TB disease to enforce the patients' adherence in TB treatment.

We have limitation in our study due to the limited sample size. We also did not monitor the adverse drug reaction due to the OAT used which may influence the patients' QoL. We recommend the future studies of QALYs with bigger sample size in Indonesian population.

CONCLUSION

We conclude that TB patients' QoL is improved in the intensive phase of treatment and continuous phase, with a QoL total score was 45.90% and 17.43%, respectively ($p < 0.05$). Moreover, the QALYs expresses that for each additional 1 year of life lived in conditions of perfect health is worth 0.74 QALY in the intensive phase and 0.87 QALY in the continuous phase.

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